[50] What is claimed is:

1. An ultracapacitor energy storage cell pack, comprising:

an ultracapacitor assembly including a plurality of parallel ultracapacitors and balancing resistors in series, each balancing resistor in parallel with each ultracapacitor to automatically discharge each ultracapacitor over time, thereby balancing the ultracapacitors of the ultracapacitor assembly;

an enclosure to enclose and protect the ultracapacitor assembly;

a controller for the ultracapacitor assembly;

one or more temperature sensors to monitor temperature of the ultracapacitor assembly and coupled to the controller;

a pack voltage sensor to monitor voltage of the ultracapacitor assembly and coupled to the controller;

a GFI sensor to monitor for a ground fault interrupt condition of the ultracapacitor assembly and coupled to the controller;

one or more cooling fans carried by the enclosure and controlled by the controller to cool the ultracapacitor assembly based upon temperature sensed by the one or more temperature sensors;

an on/off relay coupled to the ultracapacitor assembly and the controller, the on/off relay activated by the controller during normal operation of the ultracapacitor assembly and deactivated by the controller when the GFI sensor detects a ground fault interrupt condition, when the one or more temperature sensors detect an over-temperature condition, or when the pack voltage sensor detects an over-voltage condition; and

a pre-charge resistor and a pre-charge relay coupled to the ultracapacitor assembly and the controller, the pre-charge relay activated by the controller to cause the pre-charge resistor to limit pack charge current until the ultracapacitor assembly reaches a minimum voltage.

2. The ultracapacitor energy storage cell pack of claim 1, wherein the controller is a programmable logic controller with a digital data interface to an SAE standard J1939 Control Area Network (CAN).

3. The ultracapacitor energy storage cell pack of claim 1, wherein the ultracapacitor energy storage cell pack stores up to a nominal 325 watt-hours of electrical energy at up to a nominal 360 volts DC.

4. The ultracapacitor energy storage cell pack of claim 1, wherein the enclosure includes an inside with an anti-corrosion and electrical insulation coating thereon.

5. The ultracapacitor energy storage cell pack of claim 1, wherein the ultracapacitor assembly includes two polycarbonate wine rack middle plate supports with cutouts that receive the ultracapacitors and balancing resistors.

6. The ultracapacitor energy storage cell pack of claim 1, wherein the ultracapacitor assembly includes a wine rack end support plate made of a glass fabric laminate with an epoxy resin, and has a pattern of holes for mounting the ultracapacitors.

7. The ultracapacitor energy storage cell pack of claim 1, wherein the one or more cooling fans include two cooling fans, the enclosure includes a front wall with two circular cutouts to accommodate the two cooling fans, and the ultracapacitor energy storage cell pack further includes two finger guards covering the two respective cooling fans.

8. The ultracapacitor energy storage cell pack of claim 7, wherein the enclosure includes a front wall with a plurality of openings therein to allowing incoming airflow therethrough, and the ultracapacitor energy storage cell pack further includes an externally serviceable filter mounted over the plurality of openings of the front wall.

9. The ultracapacitor energy storage cell pack of claim 1, wherein the ultracapacitors are mechanically and electrically interconnected with aluminum connections.

10. The ultracapacitor energy storage cell pack of claim 1, further including a fire sensor and a fire suppression subsystem activated by the controller upon a fire indication input from the fire sensor.

11. A method of using an ultracapacitor energy storage cell pack, comprising:

providing an ultracapacitor energy storage cell pack including a ultracapacitor assembly having a plurality of parallel ultracapacitors and balancing resistor in series, each balancing resistor in parallel with each ultracapacitor to automatically discharge each ultracapacitor over time, thereby balancing the ultracapacitors of the ultracapacitor assembly and assuring a safe condition for service personnel; an enclosure to enclose and protect the ultracapacitor assembly; a controller for the ultracapacitor assembly; one or more temperature sensors to monitor temperature of the ultracapacitor assembly and coupled to the controller; a pack voltage sensor to monitor voltage of the ultracapacitor assembly and coupled to the controller; a GFI sensor to monitor for a ground fault interrupt condition of the ultracapacitor assembly and coupled to the controller; one or more cooling fans carried by the enclosure and controlled by the controller to cool the ultracapacitor assembly based upon temperature sensed by the one or more temperature sensors; an on/off relay coupled to the ultracapacitor assembly and the controller, the on/off relay activated by the controller during normal operation of the ultracapacitor assembly and deactivated by the controller when the GFI sensor detects a ground fault interrupt condition, when the one or more temperature sensors detect an over-temperature condition, or when the pack voltage sensor detects an over-voltage condition; and a pre-charge resistor and a pre-charge relay coupled to the ultracapacitor assembly and the controller, the pre-charge relay activated by the controller to cause the pre-charge resistor to limit pack charge current until the ultracapacitor assembly reaches a minimum voltage;

automatically discharging the ultracapacitors of the ultracapacitor energy storage cell with the balancing resistors to balance ultracapacitors of the ultracapacitor assembly and assure a safe condition for service personnel;

cooling the ultracapacitor assembly with the one or more cooling fans based upon temperature sensed by the one or more temperature sensors;

activating the on/off relay with the controller during normal operation of the ultracapacitor assembly and deactivating the on/off relay with the controller when the GFI sensor detects a ground fault interrupt condition, when the one or more temperature sensors detect an over-temperature condition, or when the pack voltage sensor detects an over-voltage condition;

activating the pre-charge relay with the controller to cause the pre-charge resistor to limit pack charge current until the ultracapacitor assembly reaches a minimum voltage.

12. The method of claim 11, wherein the controller is a programmable logic controller with a digital data interface to an SAE standard J1939 Control Area Network (CAN).

13. The method of claim 11, wherein the ultracapacitor energy storage cell pack stores up to a nominal 325 watt-hours of electrical energy at up to a nominal 360 volts DC.

14. The method of claim 11, wherein the enclosure includes an inside with an anti-corrosion and electrical insulation coating thereon.

15. The method of claim 11, wherein the ultracapacitor assembly includes two polycarbonate wine rack middle plate supports with cutouts that receive the ultracapacitors and balancing resistors.

16. The method of claim 11, wherein the ultracapacitor assembly includes a wine rack end support plate made of a glass fabric laminate with an epoxy resin, and has a pattern of holes for mounting the ultracapacitors.

17. The method of claim 11, wherein the one or more cooling fans include two cooling fans, the enclosure includes a front wall with two circular cutouts to accommodate the two cooling fans, and the ultracapacitor energy storage cell pack further includes two finger guards covering the two respective cooling fans.

18. The method of claim 17, wherein the enclosure includes a front wall with a plurality of openings therein to allowing incoming airflow therethrough, and the ultracapacitor energy storage cell pack further includes an externally serviceable filter mounted over the plurality of openings of the front wall.

19. The method of claim 11, wherein the ultracapacitors are mechanically and electrically interconnected with aluminum connections.

20. The method of claim 11, further including a fire sensor and a fire suppression subsystem activated by the controller upon a fire indication input from the fire sensor.